UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

5/5/00

MEMORANDUM

SUBJECT: **Sodium Acifluorfen.** Registrant Response to Reregistration Requirements Regarding Plant Metabolism: Soybean Metabolism Study (Chemical I.D. No. 114402; MRID No. 43181901; DP Barcode D201621)

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In support of **Sodium Acifluorfen** reregistration requirements, BASF has submitted a soybean metabolism study. The Agency already has found metabolism studies in peanuts and rice to be adequate. This study has been reviewed by an HED contractor and has been revised to reflect current Agency policies.

The submitted soybean metabolism study is adequate. The major residues were acifluorfen acid, desnitroacifluorfen, and descarboxyacifluorfen. Two conjugates of the nitrophenyl ring were also identified in soybean seed, indicating cleavage of the diphenylether bond. This study, combined with the acceptable peanut and rice metabolism studies fully satisfy the Sodium Acifluorfen requirements for Nature of the Residue in Plants (OPPTS 860.1300).

Attachment: 14 pp.

SODIUM ACIFLUORFEN

P.C. Code 114402; Case 2605

(CBRS No. 13507; DP Barcode D201621)

REGISTRANT'S RESPONSE TO RESIDUE CHEMISTRY REQUIREMENTS

BACKGROUND

The Acifluorfen Phase 4 Review (S. Funk, 2/14/91) required new plant metabolism studies on legume vegetables (soybeans), a cereal grain (rice), and peanuts. Peanut and rice metabolism studies have already been reviewed and found to be adequate (S. Knizner, 6/7/95, D205291 and L. Cheng, 4/4/96, D222843, respectively). BASF Corporation has recently submitted data pertaining to the metabolism of [^{14}C]sodium acifluorfen in soybeans (1994; MRID 43181901). These data are reviewed here to determine their adequacy in fulfilling the outstanding requirement for plant metabolism.

Tolerances for residues of sodium acifluorfen are currently expressed as the combined residues of the sodium salt of acifluorfen (sodium 5-[2-chloro-4-trifluoromethyl)-phenoxy]-2-nitrobenzoic acid) and its metabolites (the corresponding acid, methyl ester, and amino analogues) in or on plant and livestock commodities [40 CFR § 180.383]. The Pesticide Analytical Manual (PAM) Vol. II lists Method I, a GLC method with electron capture detection, as available for the enforcement of sodium acifluorfen tolerances.

There is no established Codex MRL for residues of sodium acifluorfen; therefore, there is no question with respect to Codex/U.S. tolerance compatibility.

CONCLUSIONS/RECOMMENDATIONS

1. The submitted soybean metabolism study is adequate. Although forage and fodder storage information and residue characterization were weak, these data are not required because the acifluorfen labels bear a restriction against grazing/feeding soybean forage and hay.

2. The data indicate that translocation of acifluorfen from the leaves to the seeds was limited as radioactivity in the seed was 0.48 ppm compared to 27 ppm in fodder from the same post-treatment interval. In addition, only a minor percentage of the radioactivity in the seed was identified as acifluorfen (8.9% TRR; 0.043 ppm), indicating that acifluorfen is metabolized extensively by

soybeans. The metabolism involves some cleavage of the ether bond with a subsequent conjugation of the nitrophenyl ring.

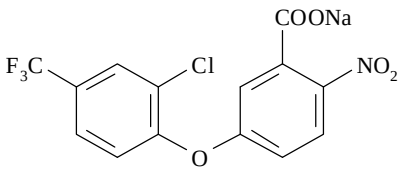
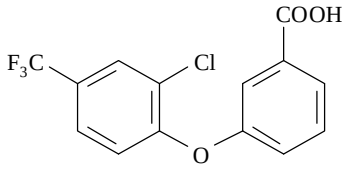
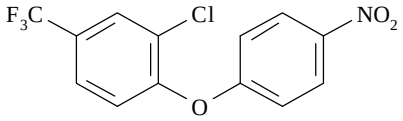
3. For forage harvested at a 0-day posttreatment interval (PTI) after the second application of [^{14}C]sodium acifluorfen, the majority of the residues were identified as acifluorfen (83% TRR; 28 ppm). Desnitro acifluorfen (0.4 % TRR; 0.15 ppm) and descarboxy acifluorfen (0.2% TRR; 0.055 ppm) were also identified. No other component or fraction contributed to >10% of the TRR and a total of 99% of the TRR was identified or characterized. Data from the analysis of forage harvested at a 0-day PTI after the first [^{14}C]sodium acifluorfen application were similar, with 92% TRR detected as acifluorfen and minor amounts of desnitro acifluorfen and descarboxy acifluorfen identified (0.1% TRR for each). The majority of the [^{14}C]residue in forage harvested at a 13-day PTI after the second application was also detected as acifluorfen (58% TRR; 16 ppm). Desnitro acifluorfen was also detected at 0.4% TRR and 0.11 ppm. A total of 97% of the TRR was characterized or identified in the 13-day forage samples with no other fraction containing >10% of the TRR.

4. For soybean fodder harvested at a 50-day PTI after the second application, a total of 53% of the TRR was identified or characterized. The only identified compound was acifluorfen at 26 % TRR (7.1 ppm). The remaining radioactivity was characterized as unknowns, saline extractables, base extractables, solids, or acetone wash of the post-extracted solids. The saline extract (16% TRR; 4.2 ppm) and the solids (23% TRR; 6.1 ppm) were not adequately characterized. All other fractions accounted for <10% of the TRR.

5. For soybean seeds, 82% of the TRR was identified or characterized. Identified metabolites include acifluorfen (8.9% TRR; 0.043 ppm), Metabolite A (6.4% TRR; 0.031 ppm) and Metabolite B (12.3% TRR; 0.059 ppm). Based on data submitted from an ongoing peanut metabolism study, Metabolite A is the cysteine conjugate of the nitrobenzoic acid ring, S-(3-carboxy-4-nitrophenyl)-cysteine, and Metabolite B is the thioglucoside conjugate of the nitrobenzoic acid ring, 3-carboxy-4-nitrophenyl thio-β-D-glucopyranoside. Characterized [^{14}C]-residues included 15 unknowns totalling 48.3% of the TRR (0.274 ppm) with no one unknown accounting for >10% of the TRR

The chemical names and structures of sodium acifluorfen and its metabolites identified in soybeans are presented in Figure 1.

Figure 1. Chemical name and structure of sodium acifluorfen and its metabolites identified in soybeans. [a]

Common/Chemical Name	Structure
Sodium acifluorfen sodium 5-(2-chloro-4-trifluoromethylphenoxy)-2-nitrobenzoate	
Desnitro acifluorfen 3-(2-chloro-4-trifluoromethylphenoxy)-benzoic acid	
Descarboxy acifluorfen 4-(2-chloro-4-trifluoromethylphenoxy)-nitrobenzene	

[a] In addition to the identified metabolites, reference standards for the following compounds were also used: acifluorfen methyl ester, amino acifluorfen, and amino acifluorfen methyl ester.

DETAILED CONSIDERATIONS

Qualitative Nature of the Residue in Plants

In-life phase

In response to the Sodium Acifluorfen Phase 4 (2/14/91) data requirements, BASF has submitted data (1994; MRID 43181901) pertaining to the metabolites of [^{14}C]sodium acifluorfen in soybeans. Two applications of [^{14}C]sodium acifluorfen, uniformly ring labeled in the nitrobenzoic acid ring and formulated as a sodium salt, were made to soybeans at ~0.27 lb ai/A/application for a total application of 0.54 lb ai/A (1.09x the stated maximum use rate). The radiolabeled compound had a specific activity of 55,500 dpm/µg and a radiochemical purity of ≥94.5%. The foliar applications were made to field grown soybeans using a hand-held sprayer at 21 and 81 days after planting. The whole aerial portion of the immature soybean plants (forage) were sampled 2-3 hours after the first and second applications and 13 days after the second application. Mature soybean seeds and fodder (including empty pods) were sampled 50 days after the second application. All samples were homogenized and stored at ~-20 C prior to analysis. Hulls were removed from the soybean seeds by hand before homogenization. Soybean seed samples were held for ~3 months prior to analysis.

The storage interval for soybean fodder and the immature samples was not indicated. However, dates on mass spectra indicate that forage was analyzed within 3 months.

To demonstrate storage stability of ^{14}C-residues, soybean seed samples were subjected to aqueous methanol extraction, protease digestion and NaCl extraction within 2 months of sample collection and again after 9 months of frozen (~-20 C) storage. HPLC analyses of the initial extracts were performed within 1 month after extraction. HPLC analyses of the stored sample extracts were performed after an additional 8 months of storage after extraction (17 months after sample collection). The chromatographic profiles before and after storage were similar with no indication of instability. These data are adequate to support the storage interval and conditions for the soybean seed samples in the current submission. However, the registrant must submit information on the storage interval of the forage and fodder samples.

The biological and analytical phases of this study were conducted by ABC Laboratories, Columbia, MO.

Total Radioactive Residue (TRR)

Five subsamples of each homogenized plant tissue were combusted and radioassayed by liquid scintillation counting (LSC). The limit of quantitation was ~0.002 ppm for forage and fodder and ~0.001 ppm for soybean seed. Radioactive residues in forage and mature soybean seed and fodder are presented in Table 1. Sample calculations were submitted. The data indicate that there was limited translocation from the leaves to the seeds and that residues were higher in the immature plant (65.6 ppm from the first sampling) relative to the mature plant (26.6 ppm in fodder from the last sampling).

Table 1. Total radioactive residues in or on mature and immature soybean

Matrix	PTI (days) [a]	TRR (ppm)
Forage	0 (1st application)	65.6
	0 (2nd application)	33.2
	13	27.8
Seed	50	0.476
Fodder	50	26.6

[a] With the exception of the first immature plant sample, the posttreatment interval (PTI) is the number of days following the second application.

[b] Expressed as sodium acifluorfen equivalents.

Extraction and Hydrolysis of Residues

All plant tissue samples were soxhlet-extracted with hexane (~5 hours) and the remaining solids were soxhlet-extracted with MeOH:H_2O (80:20, v/v, for ~5 hours). Forage samples collected at a 0-day PTI after the first and second applications were not extracted further. For forage collected at a 13-day PTI after the second application and for fodder samples, remaining solids were further extracted with 1% NaCl (reflux, 5 hours) and the post-extraction tissue was soaked at ambient temperature for ~18 hours in 0.1-0.5 M NaOH. The post-extracted fodder solids were rinsed with acetone and were not processed further. For 13-day PTI forage, the remaining solids were subjected to the following three-step enzyme hydrolyses: cellulase (pH 4.9); pectinase (pH 4.9); α-amylase (pH 6.8), each with 0.05-0.1 M sodium acetate at 37 C for 18 hours. A final acid hydrolysis using 72% H_2SO_4 at ambient temperature for 18 hours was performed on the solids remaining following the three-step enzymolysis. Reverse-phase (RP)-HPLC analyses were performed on the forage extracts with confirmation analysis performed by normal-phase TLC and/or GC/MS of the HPLC isolated components. For fodder, analyses were performed by RP-HPLC and RP-HPLC using ion pairing.

For soybean seeds, the MeOH:H_2O soxhlet extract was concentrated, acidified (pH 2), centrifuged, and cleaned-up with a C_{18} SPE BondElut column prior to analysis by HPLC. Remaining solids from hexane and MeOH:H_2O extracted soybean seed sample were hydrolyzed with protease (0.1 M sodium acetate, pH 7.5, 37 C, 18 hours). The remaining solids were further sequentially extracted with 1% NaCl (reflux, 5-6 hours) followed by 0.1 M NaOH (ambient temperature, overnight to 24 hours), and an acid hydrolysis with 6 N HCl (90 C, overnight). Further hydrolyses were performed on the protease/NaCl and NaOH extracts as follows:

An aliquot of the NaCl extract was combined with an aliquot of the protease extract (~3:1, v/v), concentrated, and centrifuged. The supernatant was acidified to pH 2 with 1 M HCl and partitioned with diethyl ether. The aqueous soluble residues were subjected to either acid (pH 2, 100 C, overnight) or base (pH adjusted to 12 with 4 N NaOH, 100 C, overnight) hydrolysis. The base hydrolysate was adjusted to a pH of 2. Both hydrolysates were partitioned with ethyl acetate (EtOAc).

An aliquot of the NaOH extract was acidified (pH 2 with 6 N HCl), centrifuged and the supernatant partitioned with EtOAc. Soybean seed extracts were characterized by RP-HPLC and RP-HPLC using ion-paring.

The fractionation and distribution of ^{14}C-residues in immature soybeans (forage, 0-day PTI and 13-day PTI), soybean fodder (50-day PTI), and in soybean seeds (50-day PTI) following two applications of [^{14}C]sodium acifluorfen are presented in Tables 2 and 3.

Characterization of Residues

RP-HPLC analyses were performed on a system equipped with a UV absorbance detector at 254 nm. Radioactivity was detected using a radioactive flow detector or by collecting fractions which were radioassayed by LSC. Samples were eluted using one

of seven different solvent systems comprised of a combination of acetic acid, H_2O, acetonitrile, MeOH, and/or trifluoroacetic acid. Components were identified by co-chromatography with reference standards. 1-D TLC analyses were performed on selected extracts using silica gel plates. One of seven solvent systems comprised of a combination of tetrahydrofuran, toluene, acetic acid, 2-butanone, 2-butanol, dichloromethane, MeOH, chloroform, and/or EtOAc were used. Isolated TLC radioactive zones were visualized using a radioanalytical imaging system.

Confirmational analyses by GC/MS and TLC were performed on the forage samples harvested at the 0-day PTI after the first application. The identifications of acifluorfen and desnitro acifluorfen were confirmed by GC/MS and TLC. Descarboxy acifluorfen was confirmed by GC/MS. GC/MS analyses were performed on residues derivatized to the methyl ester analogues with diazomethane. Adequate representative chromatograms and example calculations were submitted. A summary of the residues identified in soybean forage (0- and 13-day PTIs), fodder (50-day PTI), and seeds (50-day PTI) harvested following two applications of [^{14}C]sodium acifluorfen is presented in Table 4.

For forage harvested at a 0-day PTI after the second application of [^{14}C]sodium acifluorfen, the majority of the residues detected were acifluorfen (82.9% TRR; 27.5 ppm). Desnitro acifluorfen (0.4 % TRR; 0.148 ppm) and the descarboxy acifluorfen (0.2% TRR; 0.055 ppm) were also identified. No other component or fraction contributed to >10% of the TRR and a total of 99% of the TRR was identified or characterized. Data from the analysis of forage harvested at a 0-day PTI after the first [^{14}C]sodium acifluorfen application were similar with 91.3% TRR detected as acifluorfen and minor amounts of desnitro acifluorfen and descarboxy acifluorfen identified (0.1% TRR for each). The majority of the [^{14}C]residues in forage harvested at a 13-day PTI after the second application were also identified as acifluorfen (58.3% TRR; 16.27 ppm). Desnitro acifluorfen was also detected at 0.4% TRR and 0.105 ppm. A total of 97.1% of the TRR was characterized or identified in the 13-day forage samples with no other fraction containing >10% of the TRR.

For soybean fodder harvested at a 50-day PTI after the second application, a total of 53.3% of the TRR was identified or characterized. The only identified compound was acifluorfen at 26.7 % TRR (7.08 ppm). The remaining radioactivity was characterized as unknowns, saline extractables, base extractables, solids, or acetone wash of the post-extracted solids. The saline extract (15.8% TRR; 4.2 ppm) and the extracted solids (22.8% TRR; 6.06 ppm) were not adequately characterized. All other fractions accounted for <10% of the TRR.

For soybean seeds, 82.1% of the TRR was identified or characterized. Identified metabolites include acifluorfen (8.9% TRR; 0.043 ppm), Metabolite A (6.4% TRR; 0.031 ppm) and Metabolite B (12.3% TRR; 0.059 ppm). The registrant stated that Metabolites A and B were identified in an ongoing peanut metabolism study which has not yet been submitted. Based on the peanut study, Metabolite A is the cysteine conjugate of the nitrobenzoic acid ring, S-(3-carboxy-4-nitrophenyl)-cysteine, and

Metabolite B is the thioglucoside conjugate of the nitrobenzoic acid ring, 3-carboxy-4-nitrophenyl thio-β-D-glucopyranoside. Metabolites A and B were isolated from the peanut hulls and were coinjected on the HPLC with these same components isolated from soybeans. The chromatograms were submitted and showed a definite enhancement of both of these metabolites. In addition, LC/MS confirmation analyses of Metabolites A and B isolated from peanut hulls were also submitted.

Characterized seed ^{14}C-residues included 15 unknowns totalling 48.3% of the TRR (0.274 ppm), One component, Unknown 1, contributed a total of 17.5% TRR (0.085 ppm) in the seed. All other isolated unknowns contributed each $\leq$8.9% TRR ($\leq$0.043 ppm). The largest fraction containing Unknown 1 was the combined protease and NaCl extract where it was detected at 14.6% of the TRR (0.070 ppm). Additional work was done on this combined extract to further identify or characterize Unknown 1. The combined extract (41.8% TRR) was concentrated, solvent partitioned with ether, and the aqueous fraction was acid or base hydrolyzed. The hydrolysates were partitioned with EtOAc, and concentrated. HPLC and LCS analyses were performed on all resulting fractions. The majority of the TRR was recovered in the aqueous fraction of either the acid hydrolysate (29.0 % TRR) or the base hydrolysate (25.4 % TRR) with minor amounts recovered in the ether and the EtOAc fractions (2.1-7.6% TRR). The summation of the results from the ether fraction combined with either the acid or base hydrolysate fractions were qualitatively and quantitatively similar to the HPLC results from the original pre-hydrolyzed combined extract with one exception. Unknown 1, with the highest % TRR (14.6% TRR), decreased upon acid and base hydrolysis to 1.5% TRR and 0.2% TRR respectively. However, there was not a subsequent increase in any one component to account for the remaining ^{14}C-residues that were part of Unknown 1 indicating that is comprised of several components that were not resolved by HPLC of the original protease/NaCl extract.

The submitted soybean metabolism study is adequate. The Agency considered fodder as equivalent to hay. Although forage and fodder storage information and characterization of residues in the soybean fodder solids and saline extractable fractions were weak, these data are not required because there is a feeding/grazing restriction for forage and hay.

The data indicate that translocation of acifluorfen from the leaves to the seeds was limited as radioactivity in the seed was 0.476 ppm compared to 26.6 ppm in fodder from the same post-treatment interval. In addition, only a minor percentage of the radioactivity in the seed was identified as acifluorfen (8.9% TRR; 0.043 ppm), indicating that acifluorfen is metabolized extensively by soybeans. The metabolism involves a cleavage of the ether bond with a subsequent conjugation of the single ring compound.

Table 2. Distribution and characterization of radioactive residues in soybean forage (0- and 13-day PTI) and fodder (50-day PTI) harvested following two applications of [^{14}C]sodium acifluorfen at 0.54 lb ai/A/application (1.09x).

Table 2 (*continued*).

Sample Fraction	%TRR	ppm	Characterization/Identification
Soybean forage at 0-day PTI (33.2 ppm)			
Hexane	1.7	0.577	HPLC identified: Acifluorfen 0.4% TRR; 0.131 ppm Desnitro acifluorfen 0.4% TRR; 0.148 ppm Descarboxy acifluorfen 0.2% TRR; 0.055 ppm 7 unknowns totalling 0.7% TRR; 0.242 ppm (each at ≤0.2% TRR; ≤0.056 ppm) Solids soxhlet MeOH extracted.
80:20 MeOH:H_2O	92.3	30.7	HPLC identified: Acifluorfen 82.5% TRR; 27.4 ppm 5 unknowns totalling 9.8% TRR; 3.238 ppm (each at ≤3.4% TRR; ≤1.13 ppm)
Solids	5.0	1.66	Not analyzed further.
Soybean forage at 13-day PTI (27.8 ppm)			
Hexane	1.8	0.512	HPLC identified: Acifluorfen 0.2% TRR; 0.068 ppm Desnitro acifluorfen 0.4% TRR; 0.105 ppm 9 unknowns totalling 1.2% TRR; 0.339 ppm (each at ≤0.3% TRR; ≤0.090 ppm) Solids soxhlet MeOH extracted.
80:20 MeOH:H_2O	75.8	21.1	HPLC identified: Acifluorfen 58.1% TRR; 16.2 ppm 4 unknowns totalling 17.8% TRR and 4.945 ppm (each at ≤10.1% TRR and 2.81 ppm) Solids sequentially extracted/hydrolyzed with 1% NaCl, NaOH, cellulase, pectinase, amylase, H_2SO_4.
1% NaCl	2.8	0.783	Not analyzed further.
6N NaOH	4.1	1.150	Not analyzed further.
Cellulase	0.3	0.080	Not analyzed further.
Pectinase	0.2	0.066	Not analyzed further.
α-amylase	0.3	0.090	Not analyzed further.
H_2SO_4	2.3	0.652	Not analyzed further.

Table 2 (*continued*).

Sample Fraction	%TRR	ppm	Characterization/Identification
Solids	9.4	2.62	Not analyzed further.
Soybean fodder (26.6 ppm)			
Hexane	4.0	1.06	Not analyzed further. Solids Soxhlet MeOH extracted.
80:20 MeOH:H_2O	39.5	10.5	HPLC identified: Acifluorfen 26.7% TRR; 7.08 ppm 4 unknowns totalling 12.9% TRR and 3.42 ppm (each at ≤6.7% TRR and ≤1.79 ppm) Solids extracted with 1% NaCl followed by NaOH.
1% NaCl	15.8	4.2	Not analyzed further.
6N NaOH	9.0	2.39	Not analyzed further. Post-extracted solids rinsed with acetone.
Acetone	4.7	1.25	Not analyzed further.
Solids	22.8	6.06	Not analyzed further.

Table 3. Distribution and characterization of radioactive residues in soybean seeds harvested at a 50-day PTI following two applications of [^{14}C]sodium acifluorfen at 0.54 lb ai/A/application (1.09x).

Sample Fraction	%TRR	ppm	Characterization/Identification
Soybean seed (0.476 ppm)			
Hexane	5.0	0.024	HPLC identified: 3 unknowns totalling 2.1% TRR; 0.011 ppm (each at ≤1.4% TRR; ≤0.007 ppm) Solids Soxhlet MeOH extracted.
80:20 MeOH:H_2O	26.3	0.125	Extracted residues cleaned-up by C_{18} column chromatography prior to HPLC analysis. HPLC identified: Acifluorfen 6.3% TRR; 0.030 ppm Metabolite A 1.7% TRR; 0.008 ppm Metabolite B 6.4% TRR; 0.030 ppm 9 components (Unknowns 1, 2, 3, 5, 9, 11, 12, 13, and 15) totalling 12.0% TRR and 0.059 ppm (each at ≤2.8% TRR and 0.013 ppm) Solids protease digested followed by 1% NaCl extracted.
Protease and 1% NaCl combined	41.8	0.199	26.3% TRR in the protease digested and 15.8% TRR in the 1% NaCl extracted residues. HPLC identified:

Table 3 (*continued*).

Sample Fraction	%TRR	ppm	Characterization/Identification
			Acifluorfen 1.7% TRR; 0.008 ppm Metabolite A 4.4% TRR; 0.021 ppm Metabolite B 5.4% TRR; 0.026 ppm 12 components (Unknowns 1-6, 9-13, and 15) totalling 30.2% TRR; 0.183 (each at ≤14.6% TRR and ≤0.070 ppm which was detected at the solvent front) Solids base extracted.
0.1 M NaOH	10.5	0.050	Acidified, centrifuged, and solvent partitioned. Solids acid extracted.
EtOAc	2.1	0.010	HPLC identified: Acifluorfen 0.5% TRR; 0.003 ppm Metabolite A 0.1% TRR; 0.001 ppm Metabolite B 0.1% TRR; 0.001 ppm 7 components (Unknowns 2 and 9-13 and 15) totalling 1.3% TRR; 0.007 ppm (each at 0.4% TRR; 0.002 ppm)
Aqueous	3.8	0.018	HPLC identified: Acifluorfen 0.4% TRR; 0.002 ppm Metabolite A 0.2% TRR; 0.001 ppm Metabolite B 0.4% TRR; 0.002 ppm 8 components (Unknowns 1, 2, 4, 9, 11-13, 15) totalling 2.7% TRR; 0.014 ppm (each at 0.9% TRR; 0.005 ppm)
Precipitate	3.8	0.018	Not analyzed further.
6 N HCl	2.3	0.011	Not analyzed further.
Solids	8.2	0.039	Not analyzed further.

Table 4. Characterization of [^{14}C]-residues in soybean forage (0-day and 13-day PTIs), fodder, and seed following two applications of [^{14}C]sodium acifluorfen at 0.27 lb ai/A/application (0.54 ai/A total).

Metabolite ID	Soybean forage (0-day PTI) (TRR=33.2 ppm)		Soybean forage (13-day PTI) (TRR=27.8 ppm)		Soybean fodder (50-day PTI) (TRR=26.6 ppm)		Soybean seeds (50-day PTI) (TRR=0.476 ppm)	
	% TRR	ppm	% TRR	ppm	% TRR	ppm	%TRR	ppm
Acifluorfen	82.9	27.531	58.3	16.268	26.7	7.08	8.9	0.043
Desnitro acifluorfen	0.4	0.148	0.4	0.105				
Descarboxy acifluorfen	0.2	0.055						
Metabolite A [a]							6.4	0.031
Metabolite B [a]							12.3	0.059
Total identified	**83.5**	**27.734**	**58.7**	**16.373**	**26.7**	**7.08**	**19.5**	**0.095**
Unknowns [b]	10.5 (12, 3.4)	3.480 (12, 1.1)	19 (12, 10)	5.284 (12, 2.8)	12.9 (4, 6.7)	3.42 (4, 1.8)	48.3 (15, 15)[c]	0.274 (15, 0.07)[c]
Saline extracted			2.8	0.783				
Base extracted			4.1	1.150	9.0	2.39		
Enzyme digested			0.8 [d]	0.236				
Acid extracted			2.3	0.652			2.3	0.011
Solids	5.0	1.66	9.4	2.62			12.0 [e]	0.057 [e]
Acetone wash of solids					4.7	1.25		
Total characterized/ identified [f]	**99.0**	**32.874**	**97.1**	**27.098**	**53.3**	**14.14**	**82.1**	**0.437**
Saline extracted					15.8	4.2		
Solids					22.8	6.06		

[a] Based on data from the peanut metabolism study, Metabolite A is the cysteine conjugate of the nitrobenzoic acid ring, S-(3-carboxy-4-nitrophenyl)-cysteine, and Metabolite B is the thioglucoside conjugate of the nitrobenzoic acid ring, 3-carboxy-4-nitrophenyl thio-β-D-glucopyranoside.

[b] Values listed parenthetically are the number of unknowns followed by the unknown with the highest % TRR or ppm.

[c] The fraction containing the largest unknown (the combined NaCl and protease extracts) was acid and base hydrolyzed. Following acid hydrolysis no unknown was >5.6% TRR (0.027 ppm). Following base hydrolysis no unknown was >9.4% TRR (0.045 ppm).

[d] Total extracted ^{14}C-residues from sequential enzyme hydrolysis using cellulase, pectinase, and α-amylase.

[e] These solids are from two fractions at 3.8 and 8.2% TRR.

[f] Total characterized includes only fractions that are <10% TRR.

MASTER RECORD IDENTIFICATION NUMBER

The citation for the MRID document used in this review is presented below.

43181901 Raub, M., et. al. (1994) Metabolism of [^{14}C]Acifluorfen in Soybean: BASF Protocol No. 92511. Unpublished study prepared by BASF Corporation, 201 p.

AGENCY MEMORANDA CITED IN THIS DOCUMENT

CBRS No. 10199
DP Barcode: D180455
Subject: Sodium Acifluorfen, Reregistration. BASF Corporation Response to Phase 4 Review. Metabolism in Peanuts and Rice.
From: John Abbotts, CBRS
To: Jay Ellenberger, SRRD
Date: 12/09/92
MRID(s): 42368301 and 42368302

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From: John Abbotts, CBRS
To: Jay Ellenberger, SRRD
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From: Francis B. Suhre, CBRS
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